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TRANSMITTAL FORM

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Total Number of Pages in This Submission

Application Number	09/823,435
Filing Date	3/29/2001
First Named Inventor	Grubsky et al.
Art Unit	2877
Examiner Name	Michael P. Mooney
Attorney Docket Number	STADM-56623

ENCLOSURES *(Check all that apply)*

- [x] Fee Transmittal Form
- [x] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Reply to Missing Parts/ Incomplete Application
  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) _____
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- [ ] After Allowance Communication to TC
- [ ] Appeal Communication to Board of Appeals and Interferences
- [ ] Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
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Certificate
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	FULWIDER PATTON LLP		
Signature	John K. Fitzgerald		
Printed name	John K. Fitzgerald		
Date	1/26/2006	Reg. No.	38,881

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This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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John K. Fitzgerald, Reg. No. 38,881

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of	Examiner: Michael P. Mooney
VICTOR E. GRUBSKY ET AL.	Group Art Unit: 2877
Patent No.: 6,950,576 B1	Client ID/Matter No: STADM 56623
Issued: September 27, 2005	
Serial No: 09/823,435	
Filed: March 29, 2001	January 26, 2006
For: MODE COUPLING DEVICES WITH COMPLEX SPECTRAL PROFILE	

REQUEST FOR CERTIFICATE OF CORRECTION

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ERRORS	**APPLICATION FILE**
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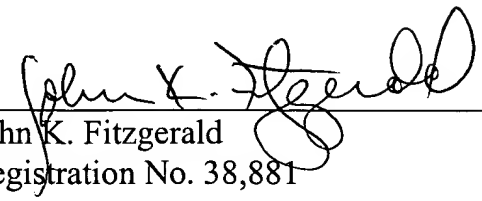
By: 
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 1

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Application Number	09/823,435
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First Named Inventor	Grubsky et al.
Art Unit	~~2874~~ 2883
Examiner Name	~~Unassigned~~ MOONEY
Attorney Docket Number	STADM-56623

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MPM	AC	WO	WO 99/45418		The University of Sydney	09-10-1999	

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Examiner Signature	Michael P. Mooney MPM	Date Considered	3/22/04; 2/23/05 MPM

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Referring now to FIG. 4, a gain flattening filter formed in accordance with the present invention is illustrated. FIG. 4 depicts a section of optical fiber 310 having a core portion 315 surrounded by a cladding layer 320. A series of long period gratings 340, 350, 360, and 370 are formed in the core portion 315 of optical fiber 310. While the refractive index modulation and the average refractive index are preferably the same for all of the gratings in the series, each grating section may have a different length, that is, a different number of perturbed and unperturbed regions. Gratings 340, 350, 360, and 370 are separated by intervals 380, 390, and 400 in the core portion. Intervals 380, 390, and 400 are typically between 0.1-10 grating periods in width, and preferably, the optimum optical length of the intervals range from 1 and 2 grating periods in width. It is well known in the art that the optical length of a medium depends not only on the physical length of the medium, but is also a function of the index of refraction of the medium. As will be discussed in more detail below, the precise optical length of each interval between the gratings comprising the gain flattening filter of the present invention may be tuned to optimize the transmission spectrum of the gain flattening filter.

Central to the mode of operation of the gain flattening filter of the present invention is utilization of gratings, that due to the design of the gratings, couples a light signal 400 encountering the gain flattening filter of the present invention from the guided core mode to a guided cladding mode such that both core and guided cladding modes are co-propagating. For example, grating 340 couples light from the core mode 400 of the fiber into guided cladding mode 420. Each subsequent grating, couples light from the guided cladding mode 420 back into the core mode 410 or from the core mode 410 into the guided cladding mode 420. This mode of operation differs substantially from that described with reference to the prior art in that the fundamental mode of light transmitted through the core is coupled into a guided cladding mode of the fiber rather than into a lossy mode.

The number of periods of each grating and the optical length of the region separating adjacent gratings determines the spectrum of light that exits the filter. A principle

$\gamma = 2\pi/\Lambda - (k_x - k_y)$ - detuning of core and cladding wavevectors from the resonance, and

$$\beta = (\gamma + d)^{1/2} / 2.$$

Detuning parameter γ can be approximated with a second-order polynomial function of wavelength λ:

$$\gamma = a_1 * (\lambda - \lambda_0) + a_2 * (\lambda - \lambda_0)^2,$$

where λ_0 is the resonance wavelength of the grating and coefficient a_1 and a_2 may be found experimentally.

The transmission spectrum $T(\lambda)$ is calculated by using a unit intensity of light in the core mode and no light in the cladding mode at the input, and rejecting the cladding mode at the output:

$$X_{in} = 1,\ Y_{in} = 0$$

$$T(\lambda) = |X_{out}|^2$$

When N uniform gratings are stacked together with phase shifts φ_n between them, the calculation of the total transmission spectrum is as follows:

$$X_{in}^{(1)} = Y_{in}^{(1)} = 0$$

$$X_{in}^{(2)} = X_{out}^{(1)},\ Y_{in}^{(2)} = Y_{out}^{(1)} \exp(i\varphi_1)$$

$$\bullet$$

$$X_{in}^{(n)} = X_{out}^{(n-1)},\ Y_{in}^{(n)} = Y_{out}^{(n-1)} \exp(i\varphi_{n-1})$$

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$$X_{in}^{(N)} = X_{out}^{(N-1)},\ Y_{in}^{(N)} = Y_{out}^{(N-1)} \exp(i\varphi_{N-1})$$

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$$T(\lambda) = |X_{out}^{(N)}|^2$$

Referring now to FIG. 7, a method of forming and fine tuning the long period gratings of the present invention is set forth. The procedure for forming the long period gratings of the present invention is broken down into two general phases. In the first phase, as indicated by the process set forth in box 800, the long period grating of the present invention is formed in the optical fiber. Using the parameters calculated as set forth above, the optical fiber is exposed to light at an appropriate wavelength, generally ultraviolet light, in box 805. During this exposure individual perturbed areas of the optical fiber are written into the fiber in order to form the grating. Typically, this exposure is accomplished by mounting the optical fiber in a suitable fixture and mechanically translating the optical fiber relative to a finely

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John K. Fitzgerald, Reg. No. 38,881

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of

VICTOR E. GRUBSKY ET AL.

Patent No.: 6,950,576 B1

Issued: September 27, 2005

Serial No: 09/823,435

Filed: March 29, 2001

For: MODE COUPLING DEVICES WITH COMPLEX SPECTRAL PROFILE

Examiner: Michael P. Mooney

Group Art Unit: 2877

Client ID/Matter No: STADM 56623

January 26, 2006

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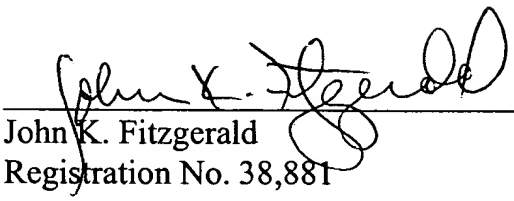
By: 
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Examiner Name	~~Unassigned~~ MOONEY
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APPLICATION NO.: 09/823,435

ISSUE DATE : September 27, 2005

INVENTOR(S) : Victor E. Grubsky et al.

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